

REMARKS/ARGUMENTS

Objection to Drawings

In paragraph 1 of the Detailed Action, the Examiner has objected to Figure 1 as not being labelled as "Prior Art". Figure 1 has been labelled "Prior Art".

The Examiner is respectfully requested to withdraw the objection to the drawings.

Claim Rejections - 35 U.S.C. 112

In paragraph 3 of the Detailed Action, the Examiner has rejected claims 5 and 14 to 18 under 35 U.S.C. 112, second paragraph, as being indefinite.

Claim 5

Regarding claim 5, the Examiner states 'applicant should clarify the specified regulation of the components of the magnetic field. In lines 9-11, there lacks sufficient structure to support the functional language "...the second primary and the second windings *is tuned by the extent* to which the components of the magnetic field are shunted through the central portion".' With respect, in claim 5 what is specified is the "cross-sectional area of the central portion, in relation to the dimensions of the marginal and connecting portions". This is done to "regulate the extent to which components of the magnetic field produced by electric currents in the windings are shunted through the central portion". With respect, there is no specified regulation of any components of a magnetic field in claim 5. Furthermore, as discussed on page 9, line 29, to page 12, line 2, support is given as to how the cross-section area of the central portion, in relation to the dimensions of the marginal and connecting portions can be specified to regulate the extent to which components of the magnetic field produced by electric currents in the windings are shunted through the central portion.

In addition, in discussing lack of structure, the Examiner refers to language which forms part of a whereby clause. Applicant submits that there is sufficient structure to support the

language referred to by the Examiner. In particular, claim 5 recites "the cross-sectional area of the central portion, in relation to the dimensions of the marginal and connecting portions, is specified to regulate the extent to which components of the magnetic field produced by electric currents in the windings are shunted through the central portion". It follows that this regulation, which refers to the cross-sectional area of the central portion in relation to the dimensions of the marginal and connecting portions, will result in the strength of the magnetic coupling between any one of the first primary and secondary windings and any one of the second primary and secondary windings being tuned by the extent to which the components of the magnetic field are shunted through the central portion.

The Examiner is respectfully requested to withdraw his 35 U.S.C. 112 rejection of claim 5.

Claim 14

Claim 14 has been amended to replace the expression "the core marginal portions terminals" with "the core marginal portions". The Examiner is respectfully requested to withdraw the 35 U.S.C. 112 rejection of claim 14.

Claims 15 to 18

Each one of claims 15 to 18 depends directly or indirectly on claim 14 and should be allowed for the same reasons as discussed above with reference to claim 14. Furthermore, although the Examiner has rejected claims 15 to 18 under 35 U.S.C. 112, the Examiner has not set forth any basis for rejecting these claims under 35 U.S.C. 112. The Examiner is respectfully requested to withdraw the 35 U.S.C. 112 rejection of claim 15 to 18.

Claim Rejections - 35 U.S.C. 102

In paragraph 5 of the Detailed Action, the Examiner has rejected claims 15 to 18 and

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Claim 1

Claim 1 is directed to a transformer and has been amended to include:

"the at least one second primary winding and the at least one second secondary winding not being directly connected to respective ones of the at least one first primary winding and the at least one first secondary winding".

Support for this claim feature is given in Figure 2 of the current application wherein first primary windings 20, 30 are shown not being connected to second primary windings 50, 60 and first secondary winding 40 is shown not being connected to second secondary winding 70. Furthermore, as shown in Figure 1 of the current application, terminals A₂₀ and B₂₀ of first primary winding 20 are connected to a TIP and LPF (Low Pass Filter) 55, respectively, while terminals A₅₀ and B₅₀ of second primary winding 50 are connected to a resistor 58 and a ground. Terminals A₃₀ and B₃₀ of first primary winding 30 are connected to a TIP and the LPF 55, respectively, while terminals A₆₀ and B₆₀ of second primary winding 60 are connected to a resistor 59 and battery 95, respectively. With regard to first and second secondary windings 40, 70, terminals A₄₀ and B₄₀ of first secondary winding 40 are connected to a xDSL circuit (see page 5, lines 25 to 26), and terminals A₇₀ and B₇₀ of the second secondary winding 70 are connected to a voice circuit (see page 6, lines 10 to 12).

With reference to Figures 3E and 3F and column 10, lines 39 to 55, of Barrett, it is seen that a first primary winding 60 is wound one half of a first leg 44 of a core 42 and its counterpart, a second primary winding 62, wound on the same half of second leg 46 of core 42. The first primary winding 60 is connected in series to second primary winding 62. Similarly, first secondary winding 64 is wound one half of first leg 44 of core 42 and is connected in series with second secondary winding 66 which is wound on the comparable half of second leg 46 of core 42. In particular, in Figures 3E and 3F of Barrett the first primary winding 60 and the second primary winding 62 are directly connected to each other and conduct the same current. Similarly, the first secondary winding 64 and the second secondary winding 66 are also directly connected to each other and conduct the same current. As such, the windings in Barrett are not as defined in claim 1 and not all of the claim features of amended claim 1 are disclosed by Barrett.

Furthermore, in Barrett the first and second primary windings 60, 62 are required to be directly connected together so that they may conduct the same current for minimizing AC flux in center leg 48 of core 42. Similarly, the first and second secondary windings 64, 66 are also required to be directly connected together so that they may conduct the same current for minimizing AC flux in center leg 48 of core 42. Having the at least one second primary winding and the at least one second secondary winding not being directly connected to respective ones of the at least one first primary winding and the at least one first secondary winding provides a limitation that teaches away from the operation of the transformer of Barrett which requires minimization of the AC flux in the center leg 48. As such, with the above claim limitation the transformer of claim 1 will operate completely differently than that of Barrett.

The Examiner is respectfully requested to withdraw the 35 U.S.C. 102(b) rejection of claim 1.

Claim 5

Claim 5 depends on claim 1 and should be allowed for the same reasons as discussed above with reference to claim 1. Furthermore, claim 5 recites:

"the cross-sectional area of the central portion, in relation to the dimensions of the marginal and connecting portions, is specified to regulate the extent to which components of the magnetic field produced by electric currents in the windings are shunted through the central portion".

The Examiner has not addressed this claim feature in rejecting claim 5. With reference to Figure 3E of Barrett, the center leg 48 has been put in place so that control winding 68 can provide a DC amp-turn product adequate to drive the core material into deep saturation (see column 11, lines 26 to 34). Furthermore, Applicant cannot find any disclosure of the cross-sectional area of leg 48, in relation to the dimensions of the legs 42 and 46 being specified to regulate the extent to which components of the magnetic field produced by electric currents in the windings are shunted through leg 48. As such, Barrett does not disclose the additional claim features of claim 5.

The Examiner is respectfully requested to withdraw the 35 U.S.C. 102(b) rejection of claim 5.

Claims 6, 10, and 12

Each one of claims 6, 10, and 12 depends directly or indirectly on claim 1 and should be allowed for the same reasons as discussed above with reference to claim 1. The Examiner is respectfully requested to withdraw the 35 U.S.C. 102(b) rejection of claims 6, 10, and 12.

In addition, claim 12 has been amended to depend on claim 10. This amendment has been made to specify that there is a first air gap and a second air gap.

Claim Rejections - 35 U.S.C. 103

In paragraph 7 of the Detailed Action, the Examiner has rejected claims 7 to 9, 11 and 13 under 35 U.S.C. 103(a) as being unpatentable over Barrett. There are three requirements for establishing a prima facie case of obviousness: 1) all features must be present; 2) there must be an expectation of a reasonable chance of success; and 3) there must be some suggestion or motivation in the prior art to combine references. Given below is a discussion on how a prima facie case of obviousness cannot be established against claims 7 to 9, 11, and 13.

Claims 7, 11, and 13

Each one of claims 7, 11, and 13 depends indirectly on claim 1 and should be allowed for the same reasons as discussed above with reference to claim 1. In particular, in Barrett, the first primary winding 60 and the second primary winding 62 are directly connected to each other in series. Similarly, the first secondary winding 64 and the second secondary winding 66 are also directly connected to each other in series. As discussed above with reference to base claim 1, this is not what is contemplated in base claim 1 wherein the at least one second primary winding and the at least one second secondary winding are not directly connected to respective ones of the at least one first primary winding and the at least one first secondary winding. As such, requirement 1) for a prima facie case of obviousness is not satisfied. Furthermore, in Barrett the first and second primary windings 60, 62 are required to be directly connected together so that they may conduct the same current for minimizing AC flux in center leg 48 of core 42.

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Similarly, the first and second secondary windings 64, 66 are also required to be directly connected together so that they may conduct the same current for minimizing AC flux in center leg 48 of core 42. As such, to have the first and second windings 60, 62 not be directly connected together and to have the first and second secondary windings 64, 66 not be directly connected together teaches away from Barrett. In particular, by having windings 60, 62 not directly connected together the restriction to conduct the same current is no longer imposed and minimization of AC flux in center leg 48 is no longer assured. Similarly, by having windings 64, 66 not directly connected together, minimization of AC flux in center leg 48 is no longer assured. As such, requirement 3) for a prima facie case of obviousness is not satisfied. The Examiner is respectfully requested to withdraw the 35 U.S.C. 103(a) rejection of claims 7, 11, and 13.

Claim 8

Claim 8 depends on claim 7 and should be allowed for the same reasons as discussed above with reference to claim 7. Furthermore, claim 8 recites:

"the magnetic coupling between any one of the first windings and any one of the second windings is in the range 0.01 to 0.25".

The Examiner has not addressed this claim feature and Applicant submits that Barrett does not disclose such a feature. In particular, Barrett does not specifically disclose the range given in claim 8 for the magnetic coupling between the first windings and the second windings as defined in claim 8. Instead, Barrett is concerned with loosely coupling primary windings and secondary windings of a transformer (see column 11, lines 29 and 30). Such primary and secondary windings are shown, for example, as first primary winding 60 and first secondary winding 64 (see Figure 3E) which are both wound around the same leg 44. Similarly, second primary winding 62 and second secondary winding 66 are loosely coupled and wound around the same leg 46 (see column 10, lines 39 to 55). In particular, in this passage the first and second primary windings 60 and 62 are being referred to as being loosely coupled with first and second primary windings 64 and 66. This is achieved by having the core 42 of the transformer being sectioned in two pieces and not by specifying dimensions of the core structure. Furthermore, as discussed above with reference to claim 5, the central leg 48 has been included to allow control

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winding 68 to provide a DC amp-turn product adequate to drive the core material into deep saturation. As such, in Barrett the central leg 48 appears to have been placed for different reasons than for the present application and there is no reason to believe the Examiner's assertion that "the specific dimensions of the core structure and the air gaps would have been an obvious design consideration for the purpose of controlling magnetic flux of the device". Furthermore, in Barrett the central leg 48 is sectioned into two pieces. This surely affects the reluctance in the central leg 48 thereby affecting the shunting effect when there is an air gap; however, there is no mention of this in Barrett.

The Examiner is respectfully requested to withdraw the 35 U.S.C. 103(a) rejection of claim 8.

Claim 9

Claim 9 depends on claim 7 and should be allowed for the same reasons as discussed above with reference to claim 7. Furthermore, claim 9 recites:

"the magnetic coupling between any two first windings is in the range 0.9 to 0.9999 and the magnetic coupling between any two second windings is in the range 0.9 to 0.9999".

With respect, Barrett does not disclose this claim feature. In particular, as discussed on column 10, line 39 to 55, first primary winding 60 and first secondary winding 64 are both wound around leg 44 but they are wound around different halves of leg 44 and are weakly coupled. Similarly, second primary winding 62 and second secondary winding 66 are both wound around leg 46 but they are wound around different halves of leg 46 and are weakly coupled. The weak coupling is due to the core 42 being separated in two halves. As such, there can be no coupling in the range defined by claim 9.

The Examiner is respectfully requested to withdraw the 35 U.S.C. 103(a) rejection of claim 9.

New claim 19 has been added and is similar in scope to original claim 1 except that new claim 19 recites "a central portion formed of a single piece of material". Applicant submits that Barrett does not disclose this claim feature. In particular, in Figure 3E of Barrett central leg 48 is

sectioned in two pieces. As discussed in column 10, lines 56 to 62, of Barrett, the two halves of core 42 can be separated resulting in a reduction in the coupling between primary and secondary windings. As such, having a central portion formed of a single piece of material teaches away from Barrett.

Applicant appreciates the Examiner's comment found in paragraph 8 of the Detailed Action which states that claims 2 to 4 would be allowable if re-written in independent form; however, given the above amendment to claim 1 and the discussion in favour of claim 1 Applicant wishes to leave claims 2 to 4 un-amended.

With regard to the Examiner's comment in paragraph 9 of the Detailed Action regarding the 35 U.S.C. 112 rejection of claim 14, Applicant submits that claim 14 has been amended to overcome this rejection.

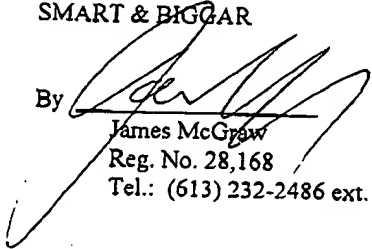
Finally, in paragraph 10 of the Detailed Action the Examiner states that "claims 15 to 18 would be allowable if re-written to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office Action and to include all of the limitations of the base claim and any intervening claims". With respect, the Examiner has not provided any basis for rejecting any of the claims 15 to 18 under 35 U.S.C. 112, second paragraph, and since each one of these claims depends directly or indirectly on allowable claim 14 and includes all of the limitations of base claim 14 and any intervening claims Applicant elects not to amend these claims at this time.

In view of the forgoing, early favorable consideration of this application is earnestly solicited.

Respectfully submitted,

SMART & BIGGAR

By


James McGraw
Reg. No. 28,168
Tel.: (613) 232-2486 ext. 310

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JMc:MPP:acb

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